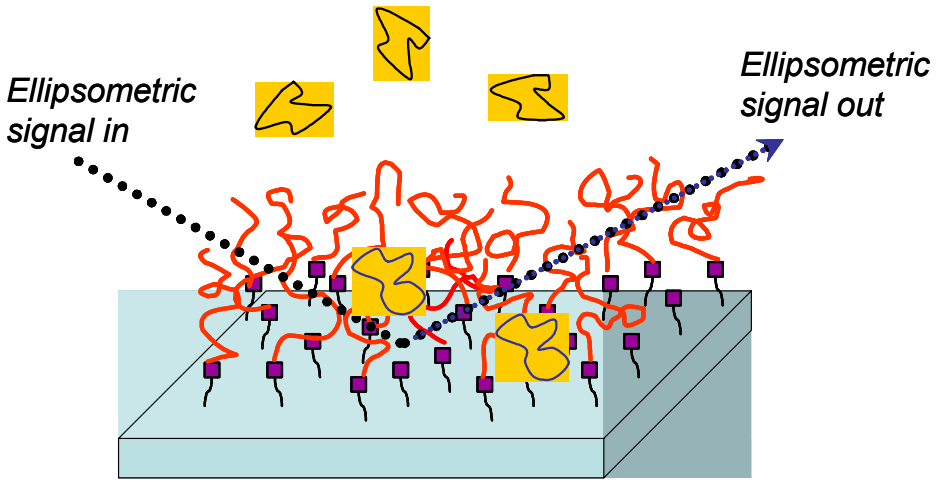
Acquisition of a High-Speed, High-Sensitivity Ellipsometer for Materials Research and Education

S. Michael Kilbey II, Scott M. Husson, Stephen Creager, and Richard Gregory, Clemson University, DMR-0215881

Materials interact with their environment through their surfaces, and the structure and properties of those surfaces ultimately determine the suitability of the material for particular applications. Consequently, the development of advanced biomaterial coatings, novel separation agents, and chemical sensor platforms rely on understanding the assembly, organization, and properties of functional materials at surfaces. A state-of-the-art ellipsometer helps a variety of researchers probe ultrathin surface layers designed for high-tech, functional coatings and devise methods to tailor those thin films.



The ellipsometer purchased with this "Instruments for Materials Research" grant allows researchers to investigate, for example, the assembly and growth of polymers (red chains) on surfaces (blue slab) and probe the changes in layer structure when species (amber shapes) are adsorbed or interact with the polymer-modified surface.

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Education:

Graduate and undergraduate students from the Chemical Engineering, Chemistry, Bioengineering, and Materials Engineering Departments use this instrument in their research. These students held an "ellipsometry summit" as a way to exchange research information and share new techniques with each other. Additionally, this instrument was used by several undergraduates from other colleges and universities who participated in the NSF-sponsored REU (Research Experience for Undergraduates) program in the Dept. of Chemical Engineering during the Summer of 2003.